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A Further Contribution to the
Study of Suppurative Disease
of the Accessory Sinuses,

WITH REPORT OF CASES.

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A FURTHER CONTRIBUTION TO
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WHILE a great deal has been written on the subject of suppurative inflammation of the accessory sinuses of the nose within the past few years, it is a subject that can hardly be said to be exhausted. It is one of great importance, and is equally interesting to the ophthalmologist as to the rhinologist, and I trust not without interest to the general practitioner. I hope to demonstrate in this communication not only the serious nature of these affections, but also to point out the frequency with which they are overlooked; for, in spite of the advances that have been made in the study of diseases of the nose and its neighboring sinuses within recent years, we still find abscesses that have existed in these cavities for a long period and have been treated for neuralgia.

* Read before the American Laryngological Association at its seventeenth annual congress.

I have selected a few typical cases from my case book which show the various phases of abscesses affecting these sinuses.

CASE I. Abscess of the Right Maxillary Sinus resulting from Dental Caries.—This patient, a man, thirty-nine years of age, stated when he consulted me that he had suffered from nasal catarrh for a number of years, the secretions being greater from the right than from the left nostril. He complained of frequent attacks of neuralgia, the pain being referred to the supraorbital and infraorbital regions rather than to the side of the face. His general health during the past year has been greatly impaired, having lost in weight, and complained of morning nausea, loss of appetite, foul breath, and difficulty in concentrating his attention on his work—that of a book-keeper in a banking house.

When first seen by me he was emaciated, tongue furred, and complexion yellow. There was no swelling of the face, but there was some tenderness on pressure over the right canine fossa. He attributed his condition to nervous dyspepsia, and was under treatment for that affection when he came under my observation. A rhinoscopic examination showed a slight hypertrophy of the inferior turbinated bodies, but no secretion was observed in either nasal chamber. On blowing the nose, however, there was a slight discharge of foul-smelling pus from the right nostril. The upper first and second molar teeth of the right side were carious. He was referred to his dentist for their removal, and when he returned he brought with him the first molar, with a portion of a needle projecting about an eighth of an inch beyond the apex of one of its roots which had penetrated the floor of the antrum. He then recalled that about eight years previously he had picked the tooth with a needle which had broken off in the cavity. As it gave him no further trouble the incident was forgotten.

The treatment consisted in washing out the sinus with hydrogen dioxide and a saturated solution of boric acid through the opening left by the extraction of the first molar.

In the course of three weeks pus had ceased to form and the alveolar opening was allowed to close.

The interesting feature of this case is the marked depression of the general health which was due to the swallowing and possibly slow absorption of the purulent secretions which had been going on for some time. Almost immediately after the removal of this source of irritation the dyspeptic and other nervous symptoms disappeared, and he soon regained his normal health.

CASE II. Suppurating Ethmoiditis terminating in Caries of the Anterior Ethmoid Cells.—Mr. C., sixty-eight years of age, consulted me December 4, 1894, stating that for ten years he had suffered with neuralgia, the pain starting at the inner angle of the left orbit, radiating over the corresponding side of the face and head, and was increased in intensity by an acute head cold. For a number of years he had a slight yellow secretion coming from the left nostril, but was not aware that it was accompanied by a bad odor. There was no swelling at the inner angle of the orbit and no disturbance of the vision.

Rhinoscopic examination showed the left middle turbinate slightly enlarged, and a thin, purulent secretion was observed coming both from above and beneath it in the middle meatus. The mucous membrane was so much swollen as to block up the upper part of the nasal chamber and prevent a thorough inspection of this cavity. On the introduction of the probe into the middle meatus, caries of the anterior ethmoid cells was readily detected.

The ethmoid cells were opened by means of a sharp curette introduced into the middle meatus and all diseased bone removed under cocaine anaesthesia. It required a number of operations to accomplish this, and great caution had to be exercised in order not to injure the orbit, as the nose in this part was exceedingly narrow. At the last examination there was no pus present and apparently all diseased

bone had been removed. The patient was entirely relieved of the pain referred to in the orbital region.

CASE III. *Abscess of the Left Frontal Sinus resulting from Nasal Polypi and Hypertrophic Rhinitis.*—The case was that of a man fifty years of age, who stated that he had been afflicted with nasal catarrh for a number of years, the secretions coming principally from the left side. He has had intense headaches, the pain being referred to the left forehead. For the past year he had not been able to breathe freely through the left nostril, and he believes his general health has been greatly impaired by his nasal trouble.

When he consulted me on April 1, 1895, he had just recovered from a severe attack of influenza, which had greatly increased his painful symptoms. The headaches were intense and were accompanied by marked mental depression, and greatly increased by any mental effort. The secretions were profuse and muco-purulent in character.

On examination the supraorbital ridges were observed to be very prominent, and the integument overlying the left frontal sinus was somewhat swollen and red, the blush extending down on the corresponding upper eyelid. There was pain on pressure both above and below the supraorbital ridge, and slight pitting of the skin on pressure over the sinus. Rhinoscopic examination showed slight hypertrophy of the right inferior turbinated body, with little or no secretion in this nostril. The left nasal chamber was found blocked up with numerous polypi springing from the middle turbinated body, and there was a marked hypertrophy of the inferior turbinate, which had become adherent to a small bony spine springing from the septum. The secretions could be blown from the nose, but a large quantity was observed passing out through the post-nasal space.

The treatment consisted in simply removing the polypi and the bony spine and reducing the hypertrophy of the inferior turbinate. This was sufficient to establish free drainage between the frontal sinus and the nose, which were found to communicate by an unusually large fronto-nasal duct. The secretions passed into the nose after all obstruction had been

removed. With the rapid subsidence of the inflammation the patient has been relieved of all his distressing symptoms. There is still a slight secretion of mucus coming from the sinus, but this is also rapidly diminishing in quantity. This case is still under observation.

CASE IV.—*Abscess of the Frontal, Ethmoidal, and Maxillary Sinuses, with Caries of the Fronto-ethmoidal Cells.*—Mrs. —, aged forty-eight years, a native of Santa Cruz, West Indies, consulted me May 10, 1894, giving the following history: For the past twenty years she has been subject to frequent catarrhal inflammation of the upper respiratory tract. She has given birth to ten living children, eight of whom are alive and healthy, and she has had fourteen miscarriages.

She did not consider her condition a serious one until about seven month ago, when she noticed for the first time a thick, yellowish discharge from the left nostril. This secretion increased in quantity and was accompanied by a bad odor. She has had constant nausea and a bad taste in the mouth for several months. There has been no pain in the teeth, which are absolutely sound. She has noticed, however, that the upper teeth of the left side project farther than those of the corresponding side, which is especially noticeable on closing the jaws. Her condition has been growing steadily worse, and about three months before coming to Washington the occasional headaches gave way to constant painful sensations over the whole of the left side of the face, but especially severe over the supraorbital ridge. At times the pain was almost unbearable. Examination showed a congestion of the whole of the left side of the face with a slight swelling of the corresponding supraorbital and infraorbital regions, and a superficial injection of the conjunctiva of the left eye. Severe pain on pressure over the supraorbital ridge and canine fossa. There was some pitting on gentle pressure over the affected sinus. The teeth were unusually large and sound, with some recession of the gums, leaving a well-defined separation between the gums and the enamel. Rhinoscopic examination revealed a slight turgescence of the inferior turbinate body of the right side. On the left side both inferior and

middle turbinated bodies were deeply congested and swollen, and the nose was filled with pus, which passed freely both from the front and into the post-nasal space when in the reclining posture.

Upon the use of the electric light the left frontal and maxillary sinuses were observed to be opaque, while the corresponding cavities of the opposite side were translucent. The examination of the eye made by Dr. W. H. Wilmer revealed a narrowing of the visual field for red and green colors, while the field for white remained normal.

The diagnosis of abscess of the maxillary and frontal sinuses having been made, on June 1st, after the extraction of the first molar tooth, I trephined through the alveolar process at this point; pus followed the withdrawal of the instrument, and about a teaspoonful of yellow gelatinous mucus, which is characteristic of inflammations of this cavity, was washed out with a warm saturated solution of boric acid. The sinus was washed out daily with hydrogen dioxide and a boric-acid solution. In the course of two weeks the secretion of pus within this cavity had apparently ceased, but large quantities of pus were still observed in the middle meatus, and the severe headaches continued.

With the subsidence of the inflammation within the maxillary sinus and upon the use of detergent and antiseptic lotions within the nose, the swelling of the turbinated bodies subsided to such an extent that ethmoid disease was excluded from the case. No diseased bone could be detected with the probe, and all attempts at sounding the fronto-nasal duct were futile.

June 18th.—The patient was sent to the Garfield Hospital and the frontal sinus opened in the following manner: After observing the customary aseptic precautions, the integument covering the supraorbital ridge was drawn up so that the line of incision would be just under the ridge when it returned to its natural position. The incision was then made through the skin down to the bone, beginning just within the supraorbital notch and terminating on the nose. After elevating the periosteum, an opening into the sinus

about one centimetre and a half in diameter was made with a chisel at a point about midway between the supraorbital notch and the nasal boss. Something less than a teaspoonful of dark green and foetid pus was washed out of the cavity. As the solutions seemed to pass freely from the sinus into the nose, it was not thought necessary to pass a drainage-tube from this cavity into the nose. The sinus was thoroughly explored with a probe, but no exposed bone could be detected, and the frontal septum was found intact. A drainage-tube was inserted into the outer opening and the wound closed. The cavity was washed out daily with hydrogen dioxide and a saturated solution of boric acid for a month. When the secretion of pus had apparently ceased, the drainage-tube was withdrawn and the opening allowed to close. I was about to discharge the patient cured, when she returned to the office one morning with pus discharging into the nose and through the fistulous opening in the forehead, with all of the former painful symptoms returned. She was sent back to the hospital on July 29th and the sinus reopened. Granulations were found around the margins of the opening in the bone and also at the inner and most dependent part of the sinus. These were scraped away with a sharp curette and the opening enlarged with the chisel. The cavity was again thoroughly explored with the probe for diseased bone or any other cause of the recurrence of the inflammation, but nothing could be detected. As the solutions passed freely through the frontonasal duct I did not even now feel justified in passing a drainage-tube from the sinus into the nose. The sinus was washed out with a solution of bichloride of mercury (1 to 6,000) and packed with iodoform gauze. This form of treatment was continued for two weeks, when, owing to a tendency of the external wound to close, the gauze dressing had to be discontinued and simple irrigations of the cavity with antiseptic solutions resorted to. Such antiseptics as the bichloride of mercury, tricresol, iodoform, and pyoctanin had no effect whatever on the secretions of pus, which continued to form in increasing quantities. In the mean time, pus was discovered again in the antrum, and during the irrigation of this

cavity one morning I noticed that solutions injected into it found their way out through the frontal sinus opening, showing there was a direct passage between the two sinuses, thus accounting for the accumulation of pus in the antrum, amounting sometimes to as much as an ounce. As the stronger antiseptics seemed to irritate the mucous membrane of the sinus and the nose, I returned to the use of hydrogen dioxide and boric acid. The wound had now closed to such an extent that a small silver drainage-tube was passed into the sinus through which the pus found a ready exit.

October 21st.—On irrigating the frontal sinus the solutions were observed for the first time to pass through both nostrils, showing that the septum had become perforated. Owing to the possibility of there being a specific element in the case, the patient was given five drops of a saturated solution of the iodide of potassium three times a day, which was later increased to thirty drops three times a day without any benefit being observed.

November 16th.—The disease has evidently been a progressive one, for upon passing the probe into the middle meatus diseased bone was detected for the first time about the anterior ethmoid cells. The anterior half of the middle turbinated body was now removed with the electric burr in order to facilitate freer drainage and to render more accessible the anterior ethmoid cells, which were broken down and scraped away with a sharp curette. This, of course, was not done at one operation, but only after a number of sittings, and working from before backward until all carious bone was removed. From this time on the patient made progress toward recovery. The drainage-tube in the frontal sinus opening was removed February 1st, when it was evident that all secretion of pus had ceased. As soon as the metallic drainage-tube was removed the opening closed and the resulting scar was scarcely perceptible. As a precautionary measure a gold drainage-tube was introduced into the opening in the alveolar process, which she continues to wear in order to admit of free drainage of that cavity in case the secretions should be started again as the result of a cold. She was discharged cured

March 1st, having been under observation for ten months. I have recently seen this patient, about two months and a half after she was discharged, and I am glad to report the sinuses were free from secretion, and the patient is comfortable and enjoying good health again.

Owing to the position of the accessory cavities, they are especially prone to inflammation, which may extend into them either from the nose or from the teeth when diseased, as in the case of the maxillary sinus. During the several epidemics of influenza that have prevailed here, I have met with a large number of cases in which the inflammation had extended into one or more of these sinuses and complicated the simple nasal affection to a very painful and serious degree. Aside from the true influenza, the inflammation of a simple rhinitis frequently extends into one or more of these cavities, and unless recognized and treated early is most likely to result in an abscess. It is very important that these cases should be recognized and treated early, for upon their early recognition depends their final issue, which in many cases has resulted in the death of the patient.

In previous communications on this subject I have devoted some attention to the suppurative inflammation of the maxillary sinus. In this paper I will limit my remarks as much as possible to the suppurative inflammation of the frontal and ethmoidal sinuses.

Aside from acute inflammations extending into these cavities, their secretions being retained and finally resulting in suppuration of their lining membrane, there are other and more frequent causes—viz., chronic catarrhal rhinitis, hypertrophic rhinitis, polypi, foreign bodies blocking up the middle meatus so that the secretions are retained within the sinuses, and finally giving way to the formation of pus.

In well-marked cases the diagnosis of abscess of the ethmoid cells is not a difficult matter ; but in many instances the symptoms are obscure, and there is frequently an implication of one or more of the neighboring cavities, so that it is almost impossible at times to tell which is the source of the pus. Then we can arrive at a diagnosis only by exclusion.

Among the earlier symptoms of abscess of the ethmoid cells may be mentioned pain, neuralgic in character, referring to the bridge of the nose, increasing in intensity with the progress of the disease, and extending outwardly along the infraorbital ridge, and occasionally along the supraorbital ridge, as was observed in Case II. With a distention of the cells there is a sense of pain and pressure felt in the orbit, exophthalmia, a narrowing of the field of vision, and if there is softening of the bone at the inner angle of the orbit crepitation may be present. On rhinoscopic examination, if the abscess is of the open variety, pus will always be found in the middle meatus, and if the posterior cells are involved it will occasionally be found passing into the post-nasal space. The middle turbinated body may or may not be enlarged ; this depends on whether it communicates directly with the ethmoid cells.

In Case II this body was only moderately enlarged, while in Case IV it was about normal in size. The probe will in the majority of instances reveal carious bone when passed into the middle meatus and upward beneath the middle turbinated body.

While occasionally an abscess may exist in the frontal sinus without giving rise to any symptoms except a slight discharge of pus from the nose, as in the case reported by Luc (1), in the majority of cases the symptoms are very pronounced, and vary in intensity according to whether the fronto-nasal duct is open or closed. Pain in the frontal re-

gion, at first dull and then becoming lancinating in character as the secretions distend the cavities, is the most common symptom; there is pain on pressure over and under the supraorbital ridge; there may also be some redness and swelling of the skin over the affected sinus, which sometimes extend down and involve the corresponding upper eyelid. If the fronto-nasal duct is open, there will be a discharge of pus from that side of the nose, and upon rhinoscopic examination pus will be found in the middle meatus, just under the anterior extremity of the middle turbinate body. This is the variety of the disease that the laryngologist most frequently meets with. If, however, the duct should be closed, then there is a dilatation of the sinus, with a tendency to bulge at its thinnest part at the inner angle of the orbit on a level with the root of the nose, and it occasions a displacement of the eye forward, downward, and outward. If there is no relief, the pus finds its way through this swelling into the orbit in the form of an orbital abscess, or ruptures posteriorly into the cranial cavity. Besides the possibility of an orbital abscess forming, among the other eye complications may be mentioned changes in the corresponding papilla, generally a hyperæmia associated with dilated and tortuous veins and a narrowing of the field of vision.

Occasionally abscess of the frontal sinus is complicated with an abscess in the ethmoidal and maxillary sinuses, as was shown in Case IV. In this case the inflammation affected the deeper cells, or the fronto-ethmoidal cells, which are well illustrated in Fig. 1.

These cells are in close proximity to the frontal sinus, and in all cases of obstinate or prolonged suppuration in this cavity they are involved in the suppurative process. In Case IV they were undoubtedly involved, which fact would account for the recurrence of the inflammation in

the frontal sinus after it had apparently ceased secreting pus. It was not until the disease advanced and the superficial cells became involved that ethmoid disease could be fully established.

Another interesting feature of this case is that after the inflammation of the maxillary sinus had been relieved, pus was found in this cavity coming from the frontal sinus, as is plainly evident from the fact that solutions injected

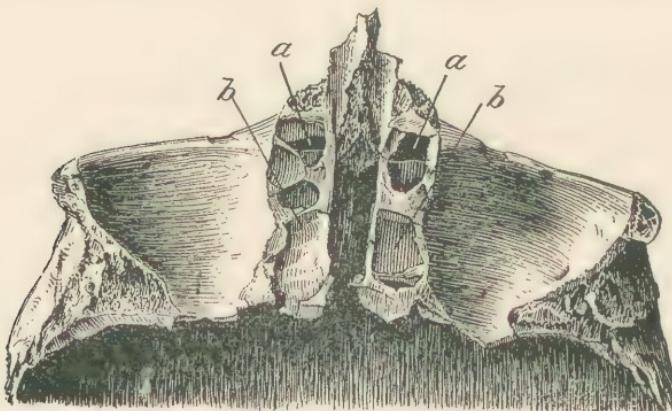


FIG. 1.—*a*, frontal sinus; *b*, fronto-ethmoid cells.

into the antrum found their way out through the opening in the supraorbital ridge. This unusual condition can be explained in two ways: either there was a natural communication between the frontal and maxillary sinuses—an anomalous condition that I have previously called attention to, and which is shown in Fig. 2—or it was pathological, resulting from caries of the anterior ethmoid cells. The latter I believe to have been the case. This anomaly has been noticed also by others. The late Professor Leidy said that he had met with it two or three times, and MacDonald (2) states that Dr. Curnow, professor of anatomy in Kings College, has also met with the same condition.

Fig. 2 shows the inner wall of the maxillary sinus, in which only two of the three openings into the middle meatus are visible.

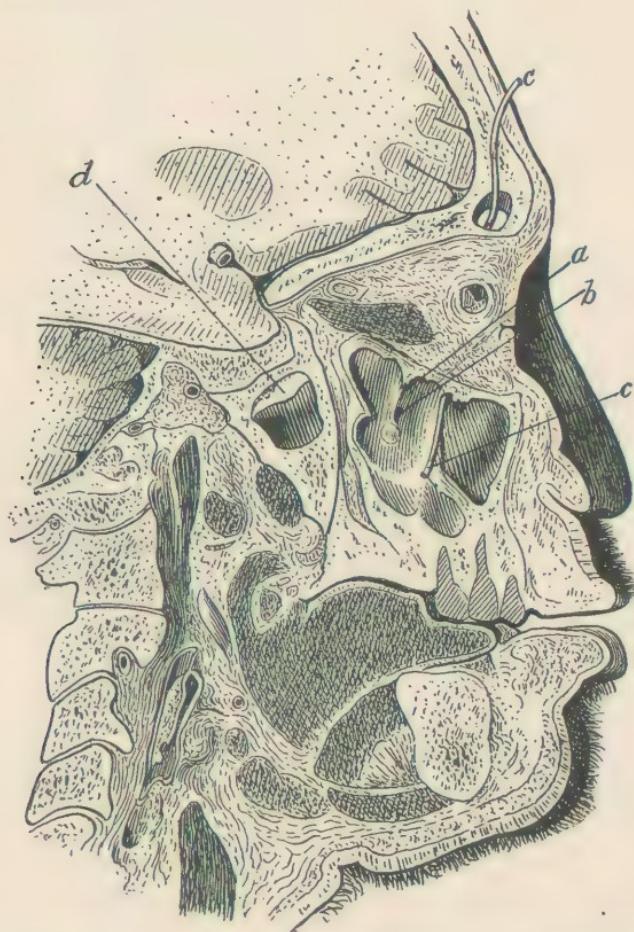


FIG. 2.—*a, b*, openings into the middle meatus; *c, c*, a probe passed from the frontal sinus into the antrum; *d*, sphenoidal sinus.

The anterior or third opening, which is not shown in this view, is normal in position, but it communicates with

a deep groove just in advance of the hiatus semilunaris which leads into the frontal sinus. By means of this groove it is possible to pass a probe from the cavity of the antrum directly into the frontal sinus, although, in so doing, it is made to enter the middle meatus first. The natural channel for pus or fluid coming from the frontal sinus would be into the antrum, in preference to the middle meatus. How often this anomalous condition occurs we do not know, but in all these cases of antral trouble which have apparently responded to treatment, but in which pus continues to accumulate, it is well to bear in mind the possibility of its coming from one of the sinuses situated above through a false or natural passage, as shown in the above figure.

In simple uncomplicated cases of suppurating ethmoiditis, after removing the cap of the middle turbinated body either with the snare or the electric burr, I prefer to continue the opening of the individual cells with a sharp curette, an instrument I consider safer than the electric burr, for it must be borne in mind that this is a dangerous region, and if there is any undue amount of roughness used, or if the instrument should slip, there is the possibility of penetrating the orbit or the cranial cavity.

Fig. 3 shows very well the ethmoid cells with their thin bony trabeculae, and also their relation to the frontal and sphenoidal sinuses.

Fig. 4—a cross-section of a skull showing a sectional view of the ethmoid cells and their relation to the orbital cavities—demonstrates the narrow space between the nasal wall of the ethmoidal sinus and the orbit.

In case the deeper or fronto-ethmoidal cells are involved, then we should not attempt to relieve them through the nose, although it was done successfully in Case IV, as the operation is not unattended with danger, but the

case should be treated, as one of frontal sinus abscess, of which this condition is a very frequent complication. The same object is to be sought in the treatment of abscesses of the frontal sinuses as in the other neighboring cavities of the nose—that is, to evacuate the pus and establish free drainage. In a few cases this can be accomplished, as in Case III, by removing any hypertrophy, polypi, or anything within the nose that serves to obstruct the fronto-nasal duct, when, if this duct is pervious, free drainage

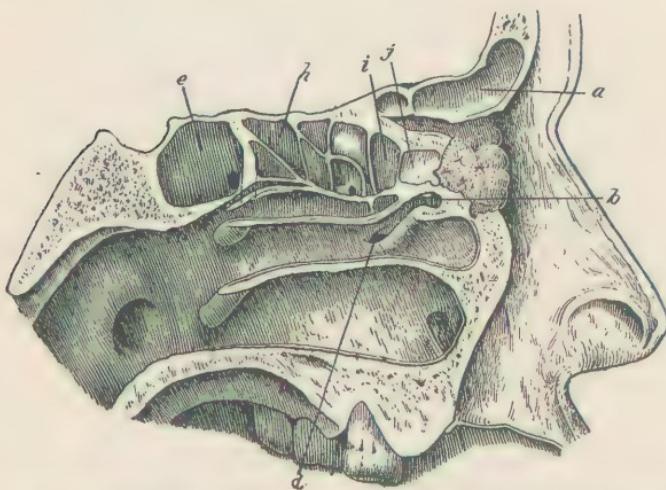


FIG. 3.—An antero-posterior section through the ethmoid cells, showing their relation to the frontal and sphenoidal sinuses. (Gouguenheim and Glover.)

can be maintained, and the inflammation of the lining membrane, if not having existed too long, may subside and the patient eventually fully recover. If, however, the duct should be blocked, then an attempt should be made to pass a probe into it so that its permeability can be re-established. Sounding the fronto-nasal duct is by no means an easy procedure, and when possible it is more applicable in cases of mucocele than in cases of suppura-

tive inflammation, and it prevents the former painful condition from being converted into the much more serious affection of abscess of the frontal sinus.

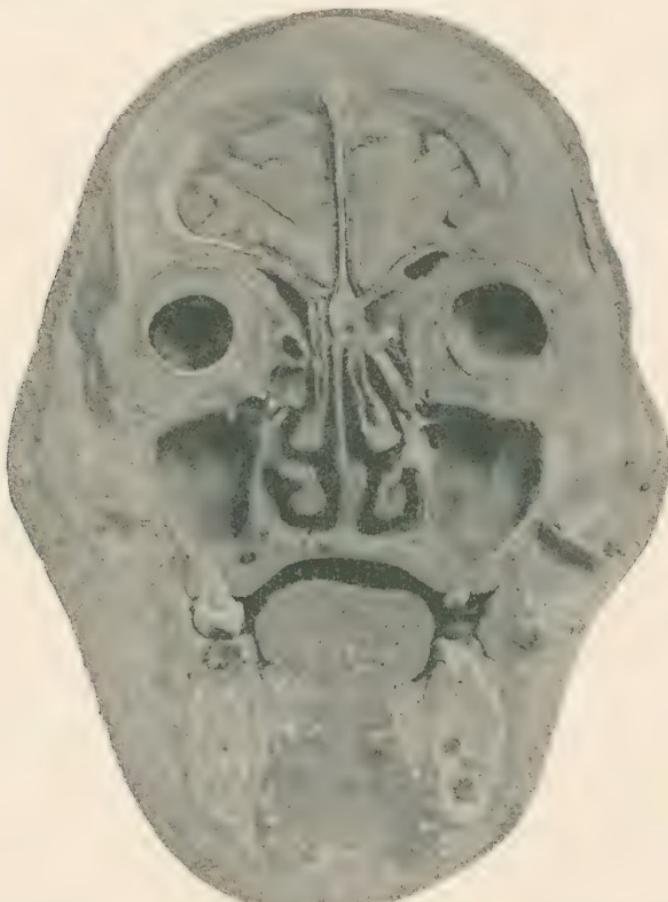


FIG. 4.—Cross section of a skull, showing a sectional view of the ethmoid cells and their relation to the orbital cavities and the middle turbinate bodies.

In the majority of cases of abscess of this sinus, if of long standing, it will be found necessary to make an artificial opening. The incision, after gently drawing the

skin on the forehead, should be made along the lower border of the supraorbital ridge down to the bone, commencing just within the supraorbital notch and terminating on the nose ; generally this form of incision will be sufficient, but in those cases where there is well-defined necrosis of the outer table of the bone, then the method of Panas (3) should be adopted—that is, of making another incision perpendicular to that along the supraorbital ridge, and the triangular flap thus formed is detached from the bone together with the periosteum, and the sinus perforated near the inner angle of the orbit. The opening should be sufficiently large to admit of a thorough exploration of the sinus with the finger and probe. Any osteophites or granulations must be removed with the curette. If the sæptum dividing the two cavities is not already broken down, a thorough exploration with a probe should be made to ascertain whether there is a perforation present through which the secretions could pass into the adjoining sinus. If pus should find its way into the adjoining cavity the sæptum must be broken down and the pus evacuated. In Case IV, the sæptum as far as could be ascertained, was free from caries when the sinus was opened, but during the course of the treatment it became ulcerated at the most dependent part of the sinus, thus allowing solutions injected into the left cavity to pass out through the right nostril. If the fronto-nasal duct should remain closed, or if the fronto-ethmoidal cells are implicated in the suppurative process, then a communication between the nose and this cavity should be established in order to permit of free drainage. This is best done by introducing the little finger within the nostril corresponding to the affected sinus, and then passing a curved trocar through the opening in the sinus into the nose, using the little finger as a guide. A drainage-tube is now introduced through the nose into

the sinus, and also one in the outer opening, and allowed to remain until all suppuration has ceased. The cavity should

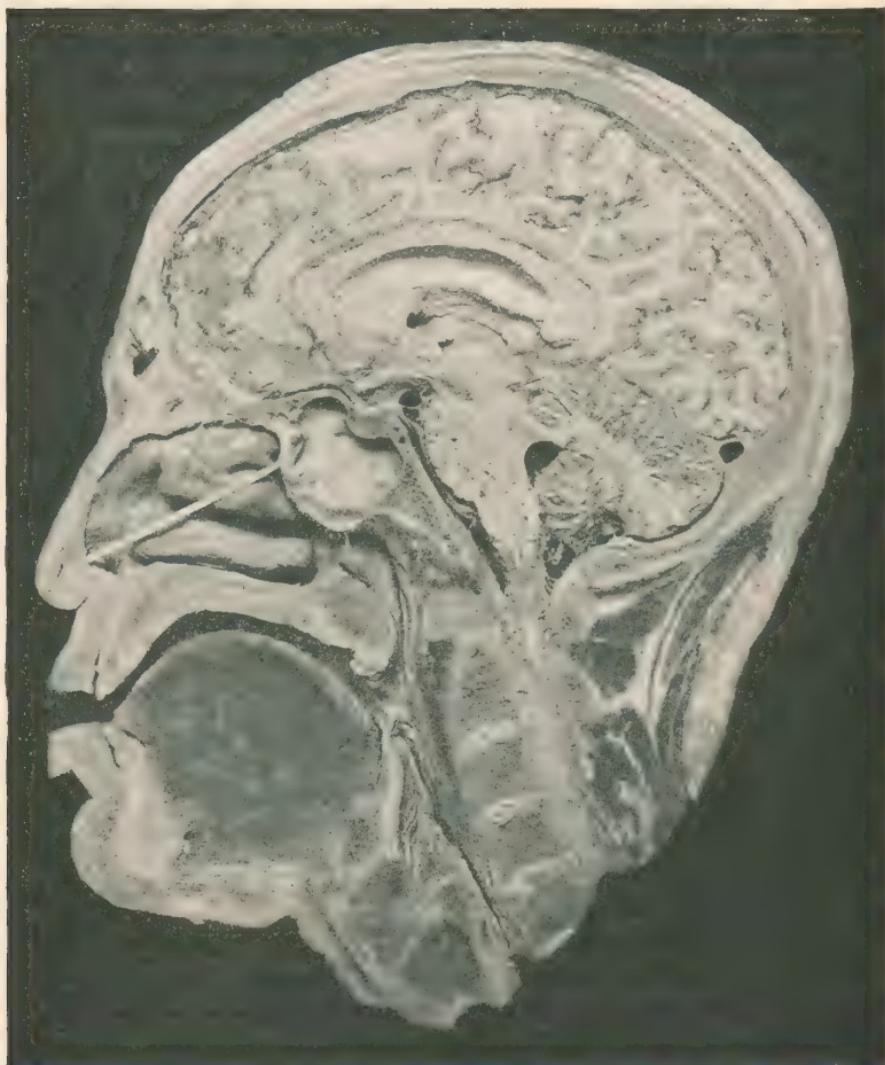


FIG. 5.—A sectional view of a skull, showing the distance from a point just within the nostril to the anterior wall of the sphenoidal sinus to be two inches and a half, as measured by a band graduated in halfinches.

be irrigated daily with some mild antiseptic solution, preferably a saturated solution of boric acid, and hydrogen dioxide.

Suppurative disease of the sphenoidal sinus occurs much more rarely than it does in any of the other accessory cavities. While it does occur as an independent affection, it is more frequently observed as a complication of abscess of the ethmoidal sinus, where the thin bony partition, as shown in Fig. 3, between the posterior cells and the sphenoidal sinus is broken down and their contents discharged into the latter cavity.

Fig. 5 is an antero-posterior view of a skull showing very well the relation of the sphenoidal sinus to the superior and middle turbinated bodies.

Owing to the frequency of the implication of the fronto-ethmoidal cells in frontal sinus abscess, Jansen (4) recommends the removal of the under wall of the sinus. The same object is obtained in passing the trocar from the sinus into the nose. These cells are then drained directly into the nose.

The treatment of these cases will occasionally be found very tedious and discouraging, but if care has been taken to establish free drainage, and the antiseptic applications are thoroughly applied, the majority of patients will recover.

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The New York Medical Journal.

A WEEKLY REVIEW OF MEDICINE.

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